

CLAIMS

What is claimed is:

1. A reactive adhesive formulation for use in a limited play data storage medium, the reactive adhesive formulation comprising:

at least one adhesive material;

at least one reactive material disposed within the at least one adhesive material; and

at least one photo-bleaching retarder material disposed within the at least one adhesive material.

2. The reactive adhesive formulation of claim 1, wherein the at least one photo-bleaching retarder material comprises a polyhydroxy compound of structure VI.

3. The reactive adhesive formulation of claim 2, wherein the at least one photo-bleaching retarder material comprises a polyhydroxy compound of structure VII.

4. The reactive adhesive formulation of claim 3, wherein the at least one photo-bleaching retarder material comprises a polyhydroxy compound selected from the group consisting of resorcinol, 4-hexylresorcinol, chlororesorcinol, an oxidation product of resorcinol and 2,4-dihydrobenzoic acid.

5. The reactive adhesive formulation of claim 3, wherein the polyhydroxy compound is present in a range of between about 0 weight % and about 10 weight %, based upon the total weight of the reactive adhesive formulation.

6. The reactive adhesive formulation of claim 5, wherein the polyhydroxy compound is present in a range of between about 2 weight % and about 5 weight %, based upon the total weight of the reactive adhesive formulation.
7. The reactive adhesive formulation of claim 1, wherein the at least one photo-bleaching retarder material comprises a polymeric polyhydroxy compound.
8. The reactive adhesive formulation of claim 7, wherein the at least one photo-bleaching retarder material comprises polyhydroxystyrene.
9. The reactive adhesive formulation of claim 8, wherein the polyhydroxystyrene is present in a range of between about 0 weight % and about 12 weight %, based upon the total weight of the reactive adhesive formulation.
10. The reactive adhesive formulation of claim 9, wherein the polyhydroxystyrene is present in a range of between about 7 weight % and about 12 weight %, based upon the total weight of the reactive adhesive formulation.
11. The reactive adhesive formulation of claim 3, wherein the at least one photo-bleaching retarder material comprises a combination of the polyhydroxy compound and polyhydroxystyrene.
12. The reactive adhesive formulation of claim 4, wherein the at least one photo-bleaching retarder material comprises a combination of resorcinol and polyhydroxystyrene.
13. The reactive adhesive formulation of claim 4, wherein the at least one photo-bleaching retarder material comprises a combination of 4-hexylresorcinol and polyhydroxystyrene.
14. The reactive adhesive formulation of claim 1, wherein the at least one reactive material comprises a reactive material selected from the group consisting of oxygen

sensitive leuco methylene blue, a reduced form of methylene blue, a reduced form of brilliant cresyl blue, a reduced form of basic blue 3, a reduced form of toluidine 0, a derivative of one of the foregoing reactive materials and a combination comprising at least one of the foregoing reactive materials.

15. The reactive adhesive formulation of claim 1, wherein the at least one adhesive material comprises an adhesive material selected from the group consisting of UV-curable acrylates, methacrylates, urethanes, epoxies, vinyl monomers and combinations comprising at least one of the foregoing adhesive materials.

16. A limited play data storage medium, comprising:

at least one substrate;

at least one of a reactive layer and a reactive adhesive layer disposed directly or indirectly adjacent to a surface of the substrate;

wherein, if used, the reactive layer comprises at least one carrier material, at least one reactive material disposed within the at least one carrier material and at least one photo-bleaching retarder material disposed within the at least one carrier material; and

wherein, if used, the reactive adhesive layer comprises at least one adhesive material, at least one reactive material disposed within the at least one adhesive material and at least one photo-bleaching retarder material disposed within the at least one adhesive material.

17. The limited play data storage medium of claim 16, wherein the at least one photo-bleaching retarder material comprises a polyhydroxy compound of structure VI.

18. The limited play data storage medium of claim 17, wherein the at least one photo-bleaching retarder material comprises a polyhydroxy compound of structure VII.

19. The limited play data storage medium of claim 18, wherein the at least one photo-bleaching retarder material comprises a polyhydroxy compound selected from the group consisting of resorcinol, 4-hexylresorcinol, chlororesorcinol, an oxidation product of resorcinol and 2,4-dihydrobenzoic acid.

20. The limited play data storage medium of claim 18, wherein the polyhydroxy compound is present in a range of between about 0 weight % and about 10 weight %, based upon the total weight of the reactive adhesive layer.

21. The limited play data storage medium of claim 20, wherein the polyhydroxy compound is present in a range of between about 2 weight % and about 5 weight %, based upon the total weight of the reactive adhesive layer.

22. The limited play data storage medium of claim 16, wherein the at least one photo-bleaching retarder material comprises a polymeric polyhydroxy compound.

23. The limited play data storage medium of claim 22, wherein the at least one photo-bleaching retarder material comprises polyhydroxystyrene.

24. The limited play data storage medium of claim 23, wherein the polyhydroxystyrene is present in a range of between about 0 weight % and about 12 weight %, based upon the total weight of the reactive adhesive layer.

25. The limited play data storage medium of claim 24, wherein the polyhydroxystyrene is present in a range of between about 7 weight % and about 12 weight %, based upon the total weight of the reactive adhesive layer.

26. The limited play data storage medium of claim 18, wherein the at least one photo-bleaching retarder material comprises a combination of the polyhydroxy compound and polyhydroxystyrene.
27. The limited play data storage medium of claim 19, wherein the at least one photo-bleaching retarder material comprises a combination of resorcinol and polyhydroxystyrene.
28. The limited play data storage medium of claim 19, wherein the at least one photo-bleaching retarder material comprises a combination of 4-hexylresorcinol and polyhydroxystyrene.
29. The limited play data storage medium of claim 16, wherein the at least one reactive material comprises a reactive material selected from the group consisting of oxygen sensitive leuco methylene blue, a reduced form of methylene blue, a reduced form of brilliant cresyl blue, a reduced form of basic blue 3, a reduced form of toluidine 0, a derivative of one of the foregoing reactive materials and a combination comprising at least one of the foregoing reactive materials.
30. The limited play data storage medium of claim 16, wherein the at least one adhesive material comprises an adhesive material selected from the group consisting of UV-curable acrylates, methacrylates, urethanes, epoxies, vinyl monomers and combinations comprising at least one of the foregoing adhesive materials.
31. The limited play data storage medium of claim 16, wherein the at least one carrier material comprises a carrier material selected from the group consisting of thermoplastic acrylic polymers, polyester resins, epoxy resins, polythiolenes, UV curable organic resins, polyurethanes, thermosettable acrylic polymers, alkyds, vinyl resins and reaction products and combinations comprising at least one of the foregoing carrier materials.

32. The limited play data storage medium of claim 16, wherein the at least one substrate comprises a substrate selected from the group consisting of polyvinyl chloride, polyolefins, polyesters, polyamides, polysulfones, polyimides, polyether imides, polyether sulfones, polyphenylene sulfides, polyether ketones, polyether ether ketones, ABS resins, polystyrenes, polybutadiene, polyacrylates, polyacrylonitrile, polyacetals, polycarbonates, polyphenylene ethers, ethylene-vinyl acetate copolymers, polyvinyl acetate, liquid crystal polymers, ethylene-tetrafluoroethylene copolymers, aromatic polyesters, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride and tetrafluoroethylenes.

33. The limited play data storage medium of claim 16, wherein the at least one substrate comprises at least one substantially colorless substrate.

34. The limited play data storage medium of claim 16, wherein the at least one substrate comprises at least one substantially red-colored substrate.